Bonneville Power Administration
Fish and Wildlife Program FY98 Proposal Form

Section 1. General administrative information

Title **Restore Steelhead and Chinook habitat in Early Winters Creek with a watershed approach**

Bonneville project number, if an ongoing project 8029

Business name of agency, institution or organization requesting funding
The Pacific Watershed Institute

Business acronym (if appropriate) PWI

Proposal contact person or principal investigator:

Name	Jeanette Smith
Mailing Address	2366 Eastlake Ave. E, Suite 325
City, ST Zip	Seattle, WA 98102
Phone	(206) 328-8814
Fax	(206) 328-8857
Email address	jetsmith@pwi.org

Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
Four Waters Aquatics	P.O Box 454	Winthrop, WA 98862	Gretchen Umlauf
G.L. Palm Construction	P.O. Box 322	Winthrop, WA 98862	Jerry Palm

NPPC Program Measure Number(s) which this project addresses.

NMFS Biological Opinion Number(s) which this project addresses.

Steelhead were recently listed, but the biological opinion has not been issued.

Other planning document references.

Early Winters Watershed Analysis, Okanogan National Forest 1996
Multi-Objective River Corridor Plan for the Methow Basin, Okanogan County Office of Planning and Development, 1996.

Draft Methow River basin plan. Methow Valley Water Pilot Planning Project. Planning Committee. 1994.
Draft Policy of Washington Department of Fish and Wildlife Wild Salmonid Policy, WDFW, 1997.

Subbasin.

Early Winters Creek

Short description.

Use a watershed approach to protect upstream riparian and fish habitat; and restore downstream habitat in Early Winters Creek. Recapture high quality spawning and rearing habitat by reconnecting channelized reach to historic channel. Work with Ditch Board to reduce withdrawals.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish	X	Construction	X	Watershed
+	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production		Population dynamics
	Oceans/estuaries		Research	+	Ecosystems
	Climate	+	Monitoring/eval.	+	Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
		+	Acquisitions		hancement/restoration

Other keywords.

instream flow, protection, restoration

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Briefly describe measurable objectives and the tasks needed to complete each objective. Use Column 1 to assign numbers to objectives (for reference in the next table), and Column 3 to assign letters to tasks. Use Columns 2 and 4 for the descriptive text. Objectives do not need to be listed in any particular order, and need only be listed once, even if there are multiple tasks for a single objective. List only one task per row; if you need more rows, press Alt-Insert from within this table.

Obj 1,2,3	Objective	Task a,b,c	Task
1	Increase usable spawning and rearing habitat in historic channels	a	Reconstruct meander pattern
		b	Remove old bridge abuttments
2	Restore function of flood distributary channels	a	Negotiate land exchanges with private landowners
		b	remove dike
3	Increase instream flow	a	Evaluate feasible water withdrawal options
		b	Work with ditch board on water withdrawal options
4	Complete hydrology & restoration monitoring	a	Establish groundwater monitoring system
		b	Establish water use monitoring
		c	Resurvey channel profiles

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	5/98	9/99	40 %
2	3/98	9/99	16 %
3	3/98	10/99	25 %
4	3/98	12/99	19 %

Schedule constraints.

We expect to obtain HPA and shorelines permits by July 1998. We would then complete instream construction in 1998. If permitting is delayed, we will complete instream construction in 1999.

The progress in land exchange negotiations may have some effect on construction timing.

Completion date.
Instream construction will be completed in 1999.

Implementation of water withdrawal options can not be reasonable accomplished before 2002.

Section 5. Budget

List FY98 budget amounts for each category. If an item needs more explanation, provide it in the Note column. If the project uses PIT tags, include the cost ($2.90/tag). **Be sure to enter a total on the last line: this is the amount of your budget request.**

Item	Note	FY98
Personnel		48,000
Fringe benefits		18,700
Supplies, materials, non-expendable property		15,000
Operations & maintenance		
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		
PIT tags	# of tags:	
Travel		1,500
Indirect costs		16,000
Subcontracts		5,000
Other		
TOTAL		104,200

Outyear costs

Outyear costs	FY1999	FY2000	FY01	FY02
Total budget	42,300	NA		
O&M as % of total	0			

Section 6. Abstract

This project is part of a larger program to protect and restore the habitat strongholds in the Methow River Basin. This program is based on the ecologically sound principle of protecting the best, restoring the rest. Private and public partnerships have been formed to eliminate ownership boundary constraints, provide diversified funding and promote collaboration. The selection of this site resulted as a process that used existing watershed assessments to identify key watershed areas for protection and prioritize the most feasible restoration opportunities. The specific goal of this project is to increase the year round usability of anadromous and resident fish spawning and rearing habitat in Early Winters Creek. The identified objectives are: (1) restore historic fish, riparian and floodplain habitat; (2) protect and restore existing habitat; and (3) identify feasible methods to augment instream flow. Protection and restoration of critical habitats will lead to increased spawner success and juvenile survival. The design and implementation scenarios for this project were developed through historic reconstruction, channel profile surveys and hydraulic modeling. These methods were developed and shown to be effective for restoring habitat in the Chewuch River, another tributary to the Methow. By 1999, the expected outcomes are protection of 20 miles of upstream habitat, an increase of 1200 feet of high quality habitat and restoration of instream flows on a degraded alluvial fan. The design methods establish and implement a monitoring protocol that provides project evaluation.

Section 7. Project description

a. Technical and/or scientific background.

Background.

The Methow River basin is an important tributary to the Columbia River. The basin is important for sustaining high quality habitat in the Columbia River Basin. The ecosystems in the basin can provide an important stronghold for aquatic and terrestrial wildlife. Many of the watersheds in the upper Methow basin have large, continuous blocks of high quality terrestrial, riparian and aquatic habitat. Ecosystems are functional because of they are managed as wilderness or late successional reserves. These watersheds are the strongholds for ecosystem health in the basin. However, a number of issues and limiting factors are present. These include: increasing demands for developing land and water resources; naturally low summer and winter flows; increases in summer low flow conditions from water withdrawals; winter conditions such as icing and extreme low temperatures; lack of channel cover and overhanging vegetation; loss of spawning and rearing habitat through channel modifications and removal of LWD; and mortality from ineffective fish screens.

In 1995, The Pacific Watershed Institute (PWI), a 501 3(c) non profit organization, and the Okanogan National Forest's Methow Valley District (MVRD) formed a partnership through a challenge-cost share agreement. A short- and long-term strategy for the restoration of riparian and aquatic resources in the Chewuch River watershed was developed and partially implemented as directed in the Chewuch River Watershed Analysis (ONF 1994, 156-167 pp.). The Chewuch River is a major tributary of the Methow River. The Chewuch River was chosen as the first cornerstone in an overall strategy to protect and restore habitat in the Methow River basin. The Chewuch River has been identified as a key watershed under the President's Forest Plan (FEMAT 1994) and PACFISH (USDA, USDI 1994) Strategy. More than 40% of the watershed has continuous, high quality habitat because of wilderness designation in the upper watershed. A federal watershed analysis has been completed for the entire Chewuch watershed. The watershed supports populations of steelhead, spring chinook, bull trout, westslope cutthroat and rainbow trout.

As a result of the partnership, PWI won a grant from the Washington State Jobs for the Environment Program (JFE) to implement restoration projects on federal, state and private lands in the Chewuch watershed. We completed all projects within budget and on time because of the extensive coordination between partners. Twelve miles of stream were restored including the addition of 17 large woody debris structures, stabilization of 2.5 miles of stream bank and reestablishment of 20 - 30 acres of native riparian vegetation. Ten long-term monitoring sites were also established. Moreover, PWI trained six displaced workers in scientifically credible restoration and monitoring methods and provided educational opportunities for the general public. The development of a stronger partnership among state and federal agencies, Yakama tribe, local government, private landowners, citizens, and non-profit organizations was a positive benefit of the project and partnership between PWI and MVRD.. The primary purpose of this partnership is to develop and implement habitat protection and restoration strategies throughout the Methow River Basin while providing for sustainable economic development. This

partnership is committed to diverse funding, education, and identifying and implementing effective solutions through collaborative efforts.

The restoration and protection strategies are based on the "Securing the Strongholds" model developed and tested on the Chewuch River by PWI and MVRD. It is similar to the "protect the best, fix the rest" watershed principle endorsed in the WDFW Fish and Wildlife Policy. The underlying premise of the "Securing the Strongholds" model is all but the most degraded watersheds retain strongholds of ecological integrity. These stronghold sites play a role in maintaining watershed functions out of proportion to their size because the ecological processes they support are so critical to watershed health. Securing these sites can be the key to maintaining function and preserving biodiversity particularly where development or management activities threaten ecosystem processes in a watershed. These areas also provide refuge and retain biodiversity in watersheds that require restoration. Another component of the model is the development and implementation of comprehensive monitoring and evaluation programs. The Methow Valley partners support this approach because it is a cost-effective approach. We will be applying it to other watersheds in the Methow Valley, such as Early Winters Creek in 1997-1999 and are continually looking for new opportunities to link projects together.

Early Winters Creek, the subject of our proposal to BPA, is a focus watershed in the overall protection and restoration strategy for the Methow Basin. The Early Winters Creek Watershed analysis (Okanogan National Forest, 1996) strongly recommends establishing protection and restoration measures. A large portion of the watershed is designated as late successional reserve, Tier 1 Key watershed. The upper 60% of the watershed is not fragmented or roaded and provides high quality habitat. The lower 3-4 miles of the creek has been modified by roads, campground development, private development, surface water withdrawal, and channelization. However, the reach has a high potential for restoration. Restoration in the lower reach will provide approximately 1300 feet of additional high quality habitat. A partnership among PWI, MVRD, and the private landowners along Early Winters Creek has formed. All the partners are interested in restoring watershed and habitat conditions in the lower 4 miles of the Creek, protecting and maintaining the critical habitat in this reach, and protecting the upstream habitat. The lower creek is a focal point for visitors and recreationists because State Highway 20, the North Cascades Scenic Highway follows the creek and crosses it. Planning and design work have already begun in the watershed.

Early Winters Creek, located 10 miles northwest of Winthrop, has a drainage area of 52,372 acres. It is a tributary of the upper Methow River. The USFS owns 51,925 acres. The remaining 447 acres are privately owned by Arrowleaf Resort, Mazama Holdings and Tucker and Melody Barksdale. The watershed provides critical habitat for several important anadromous and resident fish species and resident and migratory wildlife species. The fish species are Summer Steelhead (*O. mykiss*), Bull Trout (*Salvelinus malma*), West Slope Cutthroat (*O. clarki*) Spring Chinook (*Oncorhynchus tshawtscha*). The Yakama Indian Nation is in the process of re-introducing Coho (*O. kisutch*) to the Methow for supplementation. Important wildlife species of concern are the Northern Spotted Owl and Mule Deer.

The water quality in Early Winters watershed is generally excellent. Although the creek flows year round, instream flow gets extremely low during late summer and winter. This is a natural limiting condition, but irrigation withdrawals in the lower 4 miles intensify the problem. In addition, improperly operated fish screens can lead to fish mortality in the

ditches. We have begun discussions with the governing ditch boards on options for lessening impacts. Arrowleaf Resort is considering the abandonment of an upper irrigation diversion next year. However, finding acceptable solutions and implementing them for the larger Early Winters ditch could take several years.

There are four primary goals of the restoration and protection plan proposed for Early Winters Watershed. (1) Relocate and restructure developed and dispersed camping adjacent to the creek to prevent further degradation from recreation impacts. (2) Obliterate roads and reduce sediment and channelization impacts. (3) Restore and improve approximately 5,000 feet of instream spawning and rearing habitat. (4) Restore water and sediment storage functions of the Early Winters Creek alluvial fan.

These activities are funded from diverse sources. PWI has begun to assess instream and riparian habitat conditions and watershed processes in the lower watershed through a cooperative agreement between PWI and Arrowleaf Resort. Money from a challenge cost-share agreement between PWI and MVRD will be used to complete NEPA and other permitting requirements and coordinate the movement of the campground. The abandoned campground will be revegetated with native riparian stock and banks will be stabilized. PWI has applied for another Washington State Jobs for the Environment Program (JFE) grant. The money from this grant will be used to finish the assessment started under funding from Arrowleaf Resort, select and implement portions of the restoration plan, inventory culvert and road hazards, establish a monitoring program, and assess effects of water withdrawals on instream flow and useable habitat. Money from this BPA proposal will support completion of the restoration activities, evaluation of water withdrawal options, and completion of restoration and hydrologic monitoring.

b. Proposal objectives.

1. This objective is to increase usable spawning and rearing habitat in historic channels. This objective will be accomplished by reconstructing a meander bend to recapture an abandoned natural channel. The expected benefits will include an increase of a maximum of 1200 feet of year round aquatic habitat maintained through the restoration of natural processes. Goals can be measured through habitat and biological monitoring and spawner surveys. Habitat surveys will indicate the amount of spawning gravel recruitment.

2. The next objective is to restore the functioning of flood distributary channels by removing a dike that prevents flood waters from accessing the alluvial fan. Allowing the fan to function decreases flood energy and sediment transport. The fan becomes an area for deposition and maintains base flow. Our monitoring protocol uses channel profiles to evaluate the effectiveness of the new distributary channels on eliminating main channel incision and removing sediment from floodwaters.

3. Increasing instream flow is an important objective for fisheries in Early Winters Creek and the mainstem Methow. Surface water rights for the Early Winters Ditch are 15 cfs. During September and October, this appropriation may be greater than 50% of the natural stream flow. In addition, the mainstem Methow goes subsurface below Early Winters. Augmenting instream flow will improve habitat in Early Winters and the Methow. We hope to negotiate a minimum 20% reduction in off-stream consumptive use.

We will assess options including transfer of surface water rights to groundwater rights, transfer of surface water rights to water trust, conjunctive use scenarios, water conservation, ditch efficiency measures and ditch screening.

4. The final objective is to establish a groundwater and water use monitoring program and to resurvey channel profiles a year after restoration has been completed. Hydrologic monitoring strategies and implementation will be initiated under the JFE grant. However, under the JFE grant only stream hydrology will be addressed. Monitoring of water use is essential to evaluating water use trends. Monitoring groundwater flow and interaction with surface water is necessary to assess potential effects of groundwater withdrawals on instream flow and on groundwater flow into spawning habitat. The groundwater monitoring also includes assessing the changes in subsurface flow patterns in the stream alluvium caused by restoration projects. One goal of designing and restoring spawning habitat is to encourage groundwater upwelling through the spawning gravel because groundwater maintains constant temperatures and flushes metabolic by-products from the redds. A measurable goal of success is that upwelling with appropriate temperature and dissolved oxygen characteristics does occur.

c. Rationale and significance to Regional Programs.

Since one of the major goals of the Fish and Wildlife Program is to increase production, ensuring spawner success and juvenile survival is imperative. Protecting key habitats in streams such as Early Winters Creek and the Methow River is critical for meeting this goal. Early Winters Creek is a critical instream refuge for Chinook and Steelhead spawning and rearing. Below this tributary the Methow River naturally goes sub-surface during low flow periods; therefore, any adjacent watered habitat provides refuge areas for fish emigrating from the dry stretch of river. In addition, maintaining higher water levels in Early Winters Creek helps mitigate the low flow condition in the Methow. Past impact from Highway 20, a county road and an adjacent campground have served to constrain the lower stream channels on the Early Winters alluvial fan. Although the constraints of the highway are permanent, we feel that some channel complexity and alluvial fan function can be restored. This will increase and improve the condition of existing spawning and rearing habitat by increasing instream flow and reducing sediment inputs into the Methow.

The assessment and development of a restoration plan for Early Winters Creek will directly address limiting factors to anadromous fish by clarifying the issues and identifying appropriate activities to reduce the watershed problems and prevent future impacts to the resource. The restoration strategy will address instream flow and screen issues related to irrigation withdrawals and groundwater interactions. It will develop options for increasing spawning and rearing habitat and the connectivity to the mainstem Methow and it will address passage problems associated with upstream barriers. Sediment sources from roads and recreation areas will be reduced through obliteration, stream bank reconstruction and revegetation. The proposed restoration scenarios will increase habitat availability and condition, protect upstream high quality habitat, and provide in channel roughness to reduce flow velocities during flood and provide cover during summer and winter low flows.

Riparian and instream restoration activities reduce the affect of icing and harsh winter conditions by inhibiting the formation of anchor ice, encouraging free flowing areas in winter and shade in summer. Ongoing monitoring of the projects provides feedback to see if these activities are addressing limiting factors effectively.

One element of PWI's mission is to link innovative science methodologies to management action. We are involved in developing watershed analysis and monitoring protocols used by Washington State, EPA, Tribes and the USFS. In addition, our crew members are participating in the most current restoration and monitoring training available.

Arrangements:

Money from this proposal will supplement funding from the MVRD and Arrowleaf Resort. This project is a continuation of the implementation of the Methow Basin restoration and preservation strategies begun in 1995 between MVRD and PWI. This project will add another terrestrial and aquatic ecosystem stronghold and builds on previous work. Should the JFE grant be awarded to PWI, additional restoration work will be done in the lower Chewuch River basin in Eight-mile and Cub Creek watersheds. The Washington Department of Fish and Wildlife will be collaborating with PWI and the Methow Conservancy on restoration projects in Cub Creek where multiple landowners have agreed to donate conservation easements. This will be in part of a USFWS, Jobs in the Woods Grant awarded to PWI.

The approach that PWI has used in the Methow Basin has generated excitement and collaboration among agencies, private groups and citizens that were not working together before the restoration projects began. This is important because there has been much dissent and polarity on water issues in the Methow Valley. The projects have generated economic opportunities for local businesses and provided training and education for local displaced workers. Since, the local equipment operators and others in the construction trades have been involved in the restoration activities, the projects have also given them a better appreciation for the issues and benefits of ecosystem protection and restoration. Volunteer groups and local land owners have become involved in the riparian and bank stabilization projects and have gained a better appreciation for how they impact the environment and learned about alternative, fish friendly methods for protecting their property. The projects have been publicized not only by the local (Methow Valley News, Wenatchee World and State-wide media (WDFW Newsletter Summer 1996).

d. Project history

Not Applicable.

e. Methods.

Baseline data:

In order to evaluate the success of any restoration project, pre-restoration conditions must be assessed and key baseline data obtained (Kondolf 1995). Pre-project channel conditions on the lower Early Winters Creek and floodplain have already been measured through extensive channel and floodplain survey techniques. Water surface elevations, discharge, incremental velocity, and channel bed roughness characteristics have

been measured. These will be used in hydraulic simulation models (HEC-2 and IFG) to identify appropriate restoration designs through predicting possible changes in flow and channel characteristics from different design options and design discharges. The channel survey data also provides the baseline for quantitatively monitoring responses of the stream channel over time.

Since the streams in the upper Methow Basin are very dynamic, particularly where they flow across alluvial fans, historical reconstruction of channel movement is necessary to detect long-term adjustments or cyclic changes. An aerial photo analysis method developed on Taneum Creek and Little Naches River and refined through work on the Chewuch River is being used to reconstruct the channel movement (Smith 1993, Wissmar et al. 1994; McIntosh et al. 1994). For assessment, we are using a modified version of the methodology developed for the Upper Chewuch Restoration Strategy on Early Winters Creek (PWI 1996).

The five **assessment** components include:

* Broad aerial photo analysis of landforms, large woody debris and riparian conditions
* Inventory of culvert and road hazards using the Culvert College method developed by Washington Trout and John Orsborn in combination with USFS Region 6 culvert classification. The criteria used include: water depth & velocity, slope, length, height, and presence of resting pools upstream and downstream
* Identification of non-road related sediment sources, including grazing
* Prioritization of hazards
* Baseline Monitoring in select key areas - including instream flow.

PWI has also developed a project scoping methodology in cooperation with the Environmental Protection Association (EPA) to identify and synthesize project objectives, limitations, resource and biological issues. The scoping method is a map based exercise that all partners participate in. The outcomes are defined objectives and project scenarios that can be selected and then implemented. We have already begun the scoping process in order to keep the project on schedule. Many of our partners have been very active in this process and the planning and coordination needed to select and implement a the desired scenario.

Earlier in 1997, PWI surveyed channel cross sections and longitudinal profiles in order to select and design appropriate restoration sites and activities. PWI will be responsible for developing designs in cooperation with the MVRD. A modified version of the USGS HEC-2 model will be used for modeling flow simulations through the cross sections. Designs will have to be reviewed by all partners, including the WA. Department of Transportation due to the presence of the State Highway 20 bridge that crosses the Creek. Designs will be developed for instream work, riparian restoration and the transformation of a campground in to day use with defined access points and improved riparian buffers. Access trails will be coordinated with the larger Methow Valley Sports Trail system to reduce the proliferation of undesignated trails and associated streambank erosion.

The assessment methodology leads directly to implementable projects. The key areas are categorized as areas needing protection, areas needing restoration or areas that have enhancement potential. Most of these sites will have important spawning or holding pool habitats adjacent or downstream of them. Factors affecting the condition of these

areas, adjacent roads, soil erodibility and riparian condition, are listed and considered in prioritizing the sites for treatment. In the tributaries, culvert and road hazards are identified and prioritized for treatment. will also be identified as key sites and be prioritized for treatment.

The habitat and instream **monitoring protocol** includes: the channel cross-section profiles, vegetation and channel photo points, discharge (Q), water temperature, Hanken and Reeves (1988) habitat classification, four substrate composition indicators (V*, pebble counts (Lisle and Hilton 1992) , gravel bar dimensions and bed composition), an indicator (Edge Ratio, Smith 1993) of channel complexity and snorkel surveys of fish species abundance and diversity. This protocol will be applied pre-construction to the lower two miles of Early Winters Creek. The protocol should be repeated shortly after construction and then on a 3-5 year interval or directly after major flood or other channel disturbing events. In 1998, we will be adding groundwater seepage meters to the monitoring protocol to identify groundwater sources and their contribution to instream flows during different seasons. We will also keep records of the number of LWD pieces and their position in each of the LWD structures installed in Early Winters. We will continue to monitor the structures after each spring snow-melt.

On the short-term the baseline data helps with identification and design of the proposed restoration strategy. Over the long-term the monitoring data will provide feedback on the success or failure of the restoration and watershed conditions as a whole. The monitoring of riparian vegetation will indicate which planting methods and plant species are most successful, which will help us to make decisions on future revegetation projects and the development of the native plant propagation program. Monitoring the composition of the structures will give guidance on how to build future structures more effectively.

Organizations within the Methow Valley, such as the Methow Watershed Council, have discussed the idea of forming citizen monitoring networks. There is some momentum building for this project, but it is likely to take some time before it is implemented. In the meantime, PWI will continue to cooperate with the Forest Service on maintaining the monitoring program and recruiting other partners to assist.

The approach we will take is to rebuild streambanks in combination with stabilization to prevent further bank erosion and provide a stable surface for riparian vegetation. We will use a combination of rock, log material, and erosion matting to rebuild bank areas that have sloughed away, but can not be regraded to a more stable angle. This combination of bank material should provide complexity on the channel margin for hiding cover. Where the old bridge abuttments and rip rap is removed, the banks will be regraded or terraced to form a stable planting area for native vegetation.

For the **instream** portion of the project, we have separated the tasks into two areas, north and south of the Highway 20 bridge. The two areas will be treated differently in order to reduce the chance of damaging the bridge. We will take a much more conservative approach to restoring and protecting fish habitat upstream of the bridge. The proposal is to improve habitat condition, recruits spawning gravel and stop channel incision in this ¼ stretch by constructing vertical drop structures from boulders and logs. In addition, existing unstable LWD would be augmented to improve the chance of its retention in the area. Some old flood control gabions would also be removed where they are no longer effective. The primary objective in this ¼ area is to increase spawning

gravel recruitment for chinook and steelhead and provide some resting pools for migrating bull trout. Secondarily, controlling vertical drop will help prevent the water table from dropping further. Maintaining higher water levels in Early Winters Creek helps mitigate the low flow condition in the Methow.

Downstream from the bridge there is greater opportunity to restore the unconstrained nature of the channel by removing diking and re-establishing the meander pattern of the channel. There are two scenarios available depending on negotiations with adjacent landowners. Two parties own parcels directly in the floodway of the creek. It is unlikely they will be able to build on these parcels. We are working with the USFS on the possibility of a land exchange or conservation easements for these parcels. If this occurs we can remove a 200 foot dike that blocks off two flood distributary channels. Opening up these channels wood restore some water and sediment storage capacity of the fan and reduce the erosive force of flooding. This could result in greater deposition and retention of spawning gravel in the lower ½ mile of stream.

Regardless of the land ownership, we can restore the natural meander pattern and reclaim 1200 feet of high quality rearing and spawning habitat below these properties. Using a large excavator, a meander bend will be reformed at an old channel split to deflect the flow into an existing side channel abandoned by the stream when it was channelized. We will use a combination of large rock and rootwads to build a reinforced bend and deflect the flow. Vertical control structures will be placed from the Bridge down to reduce flow velocity and the erosive force on the new bend.

In 1996, PWI began a native plant collection and propagation program for restoration projects in the Methow Valley. Local native plants are acclimated to the particular watershed therefore; using local material should increase survival, maintain genetic integrity and restore or maintain plant community composition. In addition, collecting and propagating plants adds another dimension to the watershed restoration business opportunities in the region. Plants, seeds and cuttings are identified and collected with the assistance of plant specialists using accepted techniques. At Early Winters we will be revegetating approximately a ¼ mile stretch along the left bank of the creek and 500 feet on the right bank. We are planning on a minimum 25 to 50 foot no touch buffers behind buck and pole fencing that will be built and installed along the adjacent camping areas. About 50% of the streambank area needs stabilization with erosion matting and willow fascines to prevent further bank erosion. The entire area will be fenced and designated trails to the stream will be constructed at appropriate places. In order to minimize the number of trails going into and out of the site, these access trails will be coordinated with the more extensive Methow Valley Sports Trails system. This site is the transition area between down and up valley trails.

Groundwater assessment will include pre-construction and post-construction measurement of seepage and subsurface flow and temperature patterns through the channel bed. The methods used are discussed in detail in Olson (1995), Dingman (1994) and Lee and Cherry (1978). Groundwater flow patterns on the alluvial fan will be predicted by supplementing existing well information and groundwater models with groundwater observation data. A conceptual framework of expected flow patterns is being developed. This provides a network design that is cost-effective and efficient. The methodology is modified from (Olson 1995). We will use the PWI Scoping method to identify options and limitation for reducing surface water withdrawals (PWI,1997).

Maintenance: The anticipated changes in channel structure and habitat use may require years to reach expected results. Channel changing flows may not occur in the year following construction. Fish populations naturally vary from year to year and events external to the watershed may alter the populations. Riparian Re-vegetation will take time to grow and become established. We are using native vegetation collected from the site, however, recreation pressure and hot, dry weather may reduce success. We are committed to maintaining the monitoring and assessment of data for at least 2 years following construction. If more time is needed, we will continue the monitoring program. The instream restoration projects are designed to be relatively maintenance free. Two planting seasons should allow for adequate maintenance on the Re-vegetation. The USFS will be responsible for maintaining the relocated roads and restructured camp areas along with the constructed access trails and buck and pole fencing in cooperation with the Methow Valley Sport Trails Association (MVSTA) and Arrowleaf Resort.

Since the upstream watershed is in LSR and unroaded designations, management activities will have little to no impact on the lower creek restoration. The post-construction assessment of channel changes will be somewhat simplified because upstream human activities will not confound the results. The presence of the highway and bridge could affect the longevity of the project if a large flood event were to compromise the bridge. Other potential threats are the encroachment of development and increasing recreation pressure. This project is taking a proactive approach to these pressures. We are cooperating with a variety of local groups on education and outreach that teaches people to understand and respect the River.

f. Facilities and equipment.

The Pacific Watershed Institute has maintained an office in the Methow Valley for the past two years to fully support the Methow Program. This office provides administrative and technical support to these projects only. Additionally, the main office in Seattle provides budget, payroll and management support. PWI owns most the necessary equipment for carrying out project assessment, monitoring and management, including a Swoffer flow meter, and self-compensating levels, rods and tapes for surveying channel profiles. We generally rent or lease hand held radios and additional computer equipment when needed. These costs would be part of the project budget as required. The groundwater monitoring portion of this proposal may require purchasing additional data loggers and PVC pipe for instrumenting monitoring wells.

Four Waters Aquatics provides crew management and they have project vehicles, computers and miscellaneous equipment needed by the field crews. Heavy equipment contractors in the Valley. G.L. Palm, own or have access to all the necessary equipment needed for the instream construction and road obliteration, including oil spill response equipment.

g. References.

Dingman, S. L. 1993. Physical Hydrology. Prentice-Hall, Inc. Englewood Cliffs, N.J.

Forest Ecosystem Management Assessment Team. 1993. Forest Ecosystem Assessment: An Ecological, Economic and Social Assessment. USDA, Forest Service and USDI Bureau of Land Management.

Frissell, C.A., Hankin, D.G. and G.H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. *Canadian Journal of Fisheries and Aquatic Sciences* **45**:834-844.

Kondolf, G.M.. 1995. Five elements for effective evaluation of stream restoration. *Restoration Ecology* 3(2):133-136.

Lee, D.R. and J.A. Cherry. 1978. A field exercise on groundwater flow using seepage meters and mini-piezometers. *Journal of Geologic Education* **27**:6-12.

Lisle and Hilton. 1992. The volume of fine sediment in pools: an index of sediment supply in gravel-bed stream. *Water Resources Bulletin* **28(2)**:371-383.

Methow Valley Water Pilot Planning Project Planning Committee. Draft Methow River Basin Plan. Washington State Department of Ecology. Olympia, WA 1994.

McIntosh, B.A., J.R. Sedell, J.E. Smith, R.C. Wissmar, S.E. Clarkes, G.H. Reeves, and L.A. Brown. 1994. Historical changes in fish habitat for select river basins of Eastern Oregon and Washington. *Northwest Science.* Volume 68, Special Issue. Pp.36 - 53.

Okanogan County Office of Planning and Development. November, 1996. Multi-Objective River Corridor Plan for the Methow Basin. Okanogon, WA.

Okanogan National Forest. 1994. Chewuch River Watershed Analysis. Winthrop Ranger District, Okanogan National Forest, U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. 267 p..

_____. 1996. Early Winters Creek Watershed Analysis. Methow Valley Ranger District, Okanogan National Forest, U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. 84 p.

Olson, P.L. 1995. Shallow Subsurface Flow Systems in a Montane Terrrace-Floodplain Landscape: Sauk River, North Cascades, Washington. Ph.D dissertation. UMI, Ann Arbor, Michigan, 277 pp.

The Pacific Watershed Institute. 1996. Chewuch River Restoration and Monitoring Program Challenge Cost-share Program Accomplishment Report - 1995-96. Unpublished report to the Methow Valley Ranger District, Okanogan National Forest. 32 p.

_____. Draft. Watershed Analysis and Management Guide. Tribal Watershed Analysis and Management Project. Draft document to the Environmental Protection Agency.

Smith, J.E. 1993. Retrospective analysis of changes in stream and riparian habitat characteristics between 1935 and 1990 in two eastern Cascade Streams. M.S. thesis. School of Fisheries, University of Washington, Seattle, WA. 143 P.

Washington State Department of Fish and Wildlife. Draft. Wild Salmonid Policy.

Washington State Department of Wildlife, Yakama Indian Nation, Colville Indian Reservation, and Washington Department of Fisheries. 1989. Methow and Okanogan Rivers Subbasin Salmon and Steelhead Production Plan. Columbia Basin System Planning, Northwest Power Planning Council. Portland, OR. 201 p.

Washington Trout. No date. Culvert College. Methodology to assess fish passage at stream crossing structures. A product of Washington Trout.

Wissmar, R.C., J.E. Smith, B.A. McIntosh, H.W. Li, G.H. Reeves, and J.R. Sedell. 1994. Ecological Health of River Basins in Forested Regions of Eastern Washington and Oregon. PNW-GTR-326. Portland, OR: U.S. Department of agriculture, Forest Servece, Pacific Northwest Research Station. 65 p.

Wissmar, R.C., J.E. Smith, B.A. McIntosh, H.W. Li, G.H. Reeves, and J.R. Sedell. 1994. A history of resource use and disturbance in Riverine Basins of Eastern Oregon and Washington (Early 1800s-1900s). *Northwest Science*. Volume 68, Special Issue. Pp. 1-35.

USDA Forest Service, USDI Bureau of Land Management. March, 1994. Environmental Assessment for the Implementation of Interim strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho and portions of California. (PACFISH) Washington, D.C.

Section 8. Relationships to other projects

Recently the partnership between PWI and MVRD has expanded by coordinating activities between different departments in the Forest Service such as recreation, engineering, and timber sale preparation. Through this broader collaboration new opportunities have opened up with other private landowners with interest in other high priority watersheds. The Early Winters project will be a collaboration on instream, riparian, fish, wildlife, recreation access, community growth and education. Private landowners like Arrowleaf Resort will be assisting in project planning, partnership coordination and community outreach as well as providing contributing cash to initiate the project in a timely manner. They are also going to coordinate their own construction activities with ours to reduce the cost of heavy equipment operations. They are also very active in the Winthrop and Mazama communities supporting education, recreation planning and community outreach. They have been instrumental in developing a relationship with the Early Winters Ditch Board, which will be critical to addressing limiting factors in Early Winters Creek.

Other local community groups such as the Methow Valley Sports Trails Association, the Methow Conservancy and the Methow Institute Foundation are all willing to help out with this project. As education and outreach is ineligible under JFE, we have applied for National Forest Foundation funds with these groups to fund an educational coordinator to develop interpretive signing and brochures for the Early Winters Creek and Methow Program. In addition, the Methow Valley District has created winter and summer aquatic ecology tours and has agreed to include trail planning and restoration education in that program. Finally, most of the local representatives of the regulatory agencies responsible for project permitting have agreed to collaborate on a coordinated permitting process to reduce the workload and increase the efficiency of the process.

The Early Winters project also has relationships to many other Methow Valley protection and restoration projects. The United States Fish and Wildlife Service

(USFWS) has chosen the Chewuch River as one of their focus watersheds for their Jobs in the Woods restoration program (JITW). We have developed a Chewuch working group to identify and implement additional projects to obliterate roads and culverts and restore overgrazed riparian habitat in high priority tributaries in 1998. In the future, USFWS may expand their focus to include projects throughout the Methow. In cooperation with the Methow Conservancy, PWI is working to link the acquisition of conservation easements with restoration on the mainstem Methow and in the Chewuch on private and State lands. We will be looking at this option for Early Winters Creek as well. We are also working with the MVRD, Arrowleaf, the MVSTA, the Methow Conservancy and the Methow Institute on environmental education and community outreach. We have applied for funding to hire an educational coordinator and continue a valley wide interpretive signing program. Four of the signs will be designed and installed around Early Winters Creek. As part of this program, local fisheries technicians are leading winter and summer aquatic ecology tours along the trail system. The tours will include explanation of the objectives and progress of the Early Winters Project in order to increase acceptance form the regional public and improve the effectiveness of the riparian and stream restoration.

All of these efforts are tied to a current initiative of the Methow Watershed Council to identify and prioritize other protection and restoration needs in the Methow Valley. The Council is in the process of forming its work plan for 1998- 2001 and looking for funding for a watershed coordinator and the prioritization program.

This project also has relevance to several BPA projects occurring in the Methow Valley, The Methow Valley Irrigation District Conversion (MVID - Proj. No. 9603401), the Yakama Indian Nation (YIN) Wenatchee-Methow Coho Supplementation Program (Proj. No. 9603302) and YIN Methow Basin Side Channel Restoration (deferred - proj. No. 5509900). Our efforts to reduce surface water withdrawals from Early Winters Creek are consistent with the objectives of the MVID project to increase instream flows in the Methow. We will gain a lot of insight from the MVID process and hope to cooperate on additional irrigation conversions in the future. The success of the coho supplementation project will be somewhat tied to habitat restoration in the Methow. YIN is currently looking at acclimation sites in and near Early Winters Creek. Restoration of spawning and rearing habitat in this areas will directly benefit released coho, returning adults and future naturally spawned juveniles. The assessment methods we have used in the Methow are directly relevant to the side channel construction project. We have successfully identified and implemented side channel restoration in the Chewuch River over the last two years. Our key area list includes other side channels that have not been implemented and we are currently working on similar assessments in the Twisp River and tributaries to the Chewuch. The methods and/or results could be used by the YIN project.

Section 9. Key personnel

PWI personnel have over 25 years of experience in developing methodologies, assessing watershed conditions and implementing monitoring protocols. The specific methods for this project have been successfully applied in the Methow Valley for the last three years. In addition, the crew supervisor, leader, and cooperating USFS fisheries technicians have been using the survey and habitat monitoring methods for the last 2 -3 years. They are now proficient enough to assist in training any new displaced workers that will be hired on

to the crew. This year the crew will receive additional data analysis training so they will be able to assist the technical staff with project layout and reporting. Two members of the crew are experienced at conducting the proposed culvert and road hazard inventories.

PWI Personnel:

Jeanette E. Smith, Project Manager & Aquatic Ecologist - 75% FTE
Patricia L. Olson, Ph.D, Hydrologist & Technical Advisor - 35% FTE

Resumes Attached.